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Unresolved maternal attachment representations, disrupted maternal behavior and disorganized attachment in infancy: links to toddler behavior problems

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Background: Attachment theory's original formulation was substantially driven by Bowlby's (1969/1982) quest for a meaningful model of the development of psychopathology. Bowlby posited that aberrant experiences of parenting increase the child's risk of psychopathological outcomes, and that these risks are mediated by the quality of the attachment relationship. To empirically examine this hypothesis, the current study explores the associations between the development of toddler behavior problems and a) maternal unresolved attachment representations, b) maternal interactive behavior, and c) infant attachment relationships. Second, we test the mediating role of disorganized attachment in the association between disruptive behavior and toddler behavior problems, as well as unresolved attachment and behavior problems. **Method:** Sixty-four adolescent mother–infant dyads participated in this longitudinal study. The Adult Attachment Interview was administered at 6 months, the Strange Situation procedure was conducted at 12 months, disrupted behavior was assessed during play interactions at 12 months using the AMBIANCE measure, and the Child Behavior Checklist (CBCL) was used to assess behavior problems at 24 months of age. **Results:** Maternal reports of externalizing problems were significantly associated with unresolved representations of attachment, disrupted maternal behavior, and disorganized attachment. Inclusion of these variables in a path analytic model suggested that disorganized attachment mediated the associations between disrupted maternal behavior and externalizing problems. Although the association between unresolved attachment representations and externalizing problems was no longer significant when mediation by disrupted behavior and disorganized attachment was taken into account, this indirect pathway was not significant. **Conclusions:** The results are consistent with Bowlby's (1969/1982) original conceptualization of the explanatory role of the attachment relationship in the development and manifestation of behavioral maladaptation. Effects of unresolved attachment on externalizing problems await further explanation. **Keywords:** Attachment, parent–child interaction, behavior problems.

Attachment theory has significantly contributed to our knowledge of the links between children's early experiences with their caregivers and subsequent social and emotional functioning and adaptation (Sroufe, Carlson, Levy, & Egeland, 1999). At the heart of Bowlby's (1969/1982, 1988, 1989) formulation of attachment theory was the proposal that early disruptive experiences in parent–child relationships would set in motion processes in children and their relationships that are carried forward in development, influencing later psychosocial functioning. This view suggests that the quality of attachment relationships mediates the effect of parenting on psychopathological outcomes (Carlson, 1998; Greenberg, 1999). Attachment theory thus provides a rich heuristic platform from which to explore the mechanisms whereby parenting behavior influences child development. Parents' own mental representations of attachment have become part of this theoretical model, based on their well-replicated

correspondence with infant attachment (Van IJzendoorn, 1995). However, there are few studies that have empirically tested this model with respect to children's emotional and behavioral problems. The current longitudinal study was aimed at testing the association between disorganized attachment in infancy and behavior problems in toddlerhood and at better understanding the mechanisms underlying this association within a broader model involving maternal representations of attachment and maternal behavior.

Ainsworth, Blehar, Waters, and Wall (1978) identified three basic patterns of infant attachment, one labeled secure, and two labeled insecure (avoidant and resistant). Collectively, these patterns of attachment are referred to as 'organized' strategies and each is based on a history of dyadic interaction that is believed to reflect the infant's expectation regarding the caregiver's response to attachment-related needs and cues. A fourth pattern of

attachment, labeled disorganized, was later proposed by Main and Solomon (1990) to account for lapses in the organization of attachment behavior in a notable minority of children. Main and Hesse (1990) suggested that disorganized attachment develops when the attachment figure is not only the haven of safety for the child, but also a source of fear. This paradox, they proposed, results in opposing behavioral tendencies to approach and to flee the parent, preventing the development of a stable strategy to use the attachment figure as a source of comfort in times of distress.

A series of meta-analyses led Van IJzendoorn, Schuengel, and Bakermans-Kranenburg (1999) to conclude that the most important precursors of disorganized attachment were maltreatment, caregiver unresolved attachment, and marital discord. The connection between maltreatment, marital discord, and frightening experiences with the parent is readily apparent but less obvious in the case of unresolved attachment. The classification of unresolved attachment is based on the caregiver's responses during the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1996), a semi-structured interview about the interviewee's childhood and current relationships with attachment figures. Unresolved attachment classifications are assigned when discourse related to experiences of loss and abuse suggests lapses in the caregiver's monitoring of reasoning or discourse. Thus, in the same way that the disorganized infant exhibits odd, unpredictable, and inexplicable behaviors, adults with unresolved attachment display mental disorganization and disorientation by way of odd and inexplicable lapses in their narratives.

To explicate the relationship between unresolved attachment representations and disorganized attachment, attachment theorists have explored the mediating role of disruptive forms of caregiving behavior expressed toward the infant (Lyons-Ruth, Bronfman, & Parsons, 1999; Main & Hesse, 1990; George & Solomon, 1999). Hesse and Main (2006) proposed that the dissociative fragments or lapses displayed during discussions of loss and trauma during the AAI are likely also elicited during interactions with the infant. When experiencing feelings of helplessness, fear, and/or threat, such subtle and infrequent lapses and associated behavioral displays may be frightening to the child. Main and Hesse (1990) suggest that the roots of disorganized attachment lie in such forms of anomalous caregiving behavior (Main & Hesse, 1990). Expanding on this hypothesis, Lyons-Ruth et al. (1999) suggested that disorganized attachment relationships result not only from a frightening or frightened caregiver but also from an extremely insensitive or neglectful caregiver.

Based on this theoretical model, Bronfman, Parsons, and Lyons-Ruth (1999) developed a coding scheme to measure *disruptive* forms of caregiving

behaviors. Based on behaviors displayed on five dimensions of disrupted behavior (affective communication errors, role/boundary confusion, fearful/disorientation, intrusive/negative, and withdrawal behavior), mothers are classified as having a disrupted or non-disrupted interactional style with their infant. A recent meta-analysis of 12 studies (including 851 families) found moderate effect sizes for the association between unresolved attachment and disrupted behavior ($r = .20$), as well as disrupted behavior and disorganized attachment ($r = .35$) (Madigan et al., 2006). Furthermore, a study by Madigan, Moran, and Pederson (2006) demonstrated that the association between unresolved attachment representations and disorganized attachment was partly explained by disrupted maternal behavior.

Attachment and psychopathology

Greenberg (1999) and Lyons-Ruth (1996) have posited that insecure attachment per se is not an indicator of psychopathology but, rather, might set a trajectory which in combination with other risk factors could lead to the development of maladjustment and psychopathology (Sroufe et al., 1999; Greenberg, 1999). In contrast, emerging empirical evidence has demonstrated that disorganized attachment, in and of itself, serves as a significant predictor of later psychopathology. In a meta-analysis of 12 studies totaling 734 parent-child dyads, Van IJzendoorn et al. (1999) found a moderate effect size ($r = .29$) between disorganized attachment and externalizing problems.

In his account of the developmental progression of behavioral and emotional pathology, Bowlby (1969/1982) proposed that the attachment system itself could serve as a mediator in the association between a child's environment and their development of healthy or deviant outcomes. This proposition was an extension of his conceptualization of attachment as a dynamic process in which caregiving characteristics are reciprocal to, and develop in parallel with, the child's attachment system (George & Solomon, 1999). These suggestions are reflected in Bowlby's (1988) discussion of adaptive and maladaptive developmental pathways: 'Which particular pathway he [the child] proceeds along is determined by the environment he meets with, especially the way his parents (or parent substitutes) treat him, and how he responds to them' (p. 136). In the remainder of the paper, Bowlby stressed the link between the caregiver's representation of attachment on the quality of their caregiving behavior and, in turn, on the child's emerging working model of attachment and later adaptive behavior. Translated into the terminology of causal models, Bowlby's ideas can be expressed as follows: specific parental representations of attachment and patterns of caregiving behaviors result in experiences for children that increase the risk of developing along deviant

pathways, and these risks are mediated by the quality of the attachment relationship. The exploration of this process does not suggest that other more direct processes (e.g., a direct impact of caregiver behavior on child maladaptive patterns) may not also be operating. Indeed, there likely are several mechanisms at work simultaneously. If we seek, however, to understand the full range of processes underlying the development of psychopathology and to design effective preventative interventions, we must target the aberrant forms of representations and behaviors most clearly implicated in the development of behavioral and attentional disorganization.

The observed associations between unresolved attachment, disrupted behavior and disorganized attachment (Madigan et al., 2006), on the one hand, and between disorganized attachment and psychopathological symptoms (Van IJzendoorn et al., 1999), on the other, lend plausibility to a model linking caregiving characteristics and psychopathology through disorganized attachment. Studies involving these three variables simultaneously, however, are few. DeKlyen (1996) examined the link between maternal representations of attachment, preschool attachment, and concurrent behavior problems in a sample containing clinic-referred children and matched controls. In her study, insecure representations of attachment (a grouping of dismissing, preoccupied, and unresolved classifications) were related to behavior problems in clinic-referred children, but this association disappeared when the association between preschool attachment and behavior problems was taken into account. Although this result suggests that the influence of insecure representations of attachment on maladaptive offspring behavior is mediated by the quality of the attachment relationship, the study lacked a formal test of mediation.

To date, only one study has examined the hypothesis that attachment disorganization mediates the relation between early caregiving and psychopathology. Carlson (1998) reported results from a prospective longitudinal study of 157 high-risk mother-infant dyads with unfavorable environmental antecedents. Psychopathology was measured using the K-SADS at 17 1/2 years and the quality of early caregiving difficulties was measured using three indicators: maternal caretaking skill during feeding at 3 months; maternal cooperation/interference and sensitivity/insensitivity during feeding and play situations in the home at 6 months; and infant abuse history. She found that infant disorganized attachment significantly mediated the effects of broadly defined caregiving experiences on adolescent psychopathology. An important finding was that caregiving behavior and infant disorganization appeared to have *additive* effects on deviant behavior. However, Carlson explicitly called for the exploration of the role of other established antecedents of disorganized attachment, including formal mea-

sures of representations of attachment and disrupted dyadic interaction. Thus, to further examine the mechanisms underlying disorganized attachment and behavior problems, the current study will utilize a longitudinal design that encompasses disorganized attachment, as well as two theoretical and empirically established precursors of disorganized attachment, disrupted behavior and unresolved attachment representations.

The current study

The two aforementioned studies are important in suggesting that attachment is a potential mediating factor linking caregiver characteristics (i.e., representations of attachment and parenting quality) and later psychopathology. Although the evidence presented is consistent with Bowlby's (1969/1982, 1988, 1989) model putting the quality of the attachment relationship central in the explanation of the effects of parental representations and ensuing parenting behavior on the development of psychopathology, formal tests of this model are sparse. The exploration of this issue requires a robust longitudinal research design that includes assessments of these processes. The current study is structured according to the requirements necessary to examine Bowlby's model, with assessments of maternal representations of attachment at 6 months, assessments of infant attachment and maternal behavior at 12 months, and maternal reports of toddler behavior problems at 24 months. Furthermore, the high base-rates of behavior problems observed in high-risk dyads, such as adolescent mother-infant dyads, make such populations particularly appropriate for the further study of the development of maladaptive patterns of behavior (Cummings, Davies, & Campbell, 2000). Samples composed of adolescent mother-infant dyads have shown to be at substantial developmental risk (Furstenberg, Levine, & Brooks-Gunn, 1990; Jaffee, Caspi, Moffitt, Belsky, & Silva, 2001). Moreover, this group is significantly more likely than those in the general population to have experienced trauma associated with sexual and physical abuse (Boyer & Fine, 1992) and thus to display the unresolved representation of attachment that is regarded as a critical risk factor for the developmental mechanisms explored here. These mothers also are more likely to exhibit a range of substantially disrupted interactions with their infants that may be implicated in the development of later psychopathology.

The central hypotheses investigated in this study were: 1) maternal reports of toddler externalizing problems will be associated with a) unresolved attachment representations, b) disrupted maternal behavior, and c) disorganized attachment; 2) following from the model proposed by Bowlby (1969/1982, 1988, 1989), we predict that disorganized attachment will mediate the association between disrupted

behavior and toddler behavior problems; and 3) based on the theoretical model in which unresolved attachment representations is a distal factor that is associated with disorganized attachment through the caregiver's display of disrupted behavior (e.g., Madigan et al., 2006), we predict that disorganized attachment and disrupted maternal behavior will mediate the association between unresolved attachment representations and externalizing behavior problems.

Method

Participants

Mothers were recruited in the hospital shortly after their infants' births. All mothers gave informed consent for their participation as approved by the institutional Research Ethics Board. Criteria for participation were as follows: mother age less than 20 years, uneventful delivery, and full-term birth without complications. Of the 138 mothers who met criteria, 25 declined to participate, 13 repeatedly canceled appointments, and 1 had an infant who died. Thus, by the end of the recruitment process, 99 dyads were involved in the study and were initially seen when the infants were 6 months of age. Of these, 90 (91%) dyads remained in the study through to the 24-month visit. Four of the 90 dyads were eliminated from the sample due to medical or technical difficulties. Of the remaining 86 dyads, there were 64 (36 girls, 28 boys) dyads with complete data on all relevant measures at 6, 12 and 24 months.

Demographic information was collected during a 6-month home visit and was updated over time. Mothers averaged 18.53 ($SD = 1.0$) years of age and 11.0 ($SD = 1.2$) years of education. Eighty-one percent of the sample was Caucasian, 5% Native American, 5% Middle Eastern, 4% Latin American, 2% of other descent. Fifty-seven percent were single, 28% common-law, and 15% were married. Average personal income fell in the CAN \$5,000–\$9,999 range – below the Canadian standard of poverty (Canadian Council on Social Development, 2004).

As part of the larger study, mothers were randomly assigned to the intervention or control group (Moran, Pederson, & Krupka, 2005). Each dyad in the intervention group was seen eight times at their place of residence between the 6th and 12th months of the infant's life. The intervention was a structured behavioral model in which mothers interacted with their infants while being videotaped and then reviewed the tapes with the home visitors (see Moran et al. for more details).

Although the intervention was not designed to have an impact on unresolved attachment, disrupted behavior, or disorganized attachment, all relevant analyses in the current study included an examination of the possibility of confounding effects of the intervention. Mothers in the intervention group did not differ from those in the control group on any of the attachment variables or on reports of toddler behavior problems. We were satisfied, then, that the intervention did not moderate the association between

attachment, maternal behavior, and reports of behavior problems.

Measures

Maternal representation of attachment: the Adult Attachment Interview (AAI; George et al., 1996). The AAI examines the mother's recollection of her past experiences with her primary attachment figures. The interviews were audiotaped and transcribed verbatim. Individuals were assigned to one of three primary attachment categories and were considered for the unresolved category (Main, Goldwyn, & Hesse, 2002). Mothers in the present study fell into one of three attachment groups, dismissing (44%), autonomous (25%), or unresolved (31%).¹ For the purposes of analyses in this study, the dismissing and autonomous groups were combined to create a dichotomous variable of not-unresolved versus unresolved.

In the current sample, twelve (19%) transcripts were randomly selected for reliability purposes. Transcripts were independently scored by two experienced coders (trained by and reliable with M. Main & E. Hesse) who were blind to infant attachment classifications. Concordance between the two coders for the four-way classifications was 92% ($\kappa = .88$, $p < .0001$). Disagreements were resolved by conferencing.

Infant attachment: The Strange Situation procedure (SSP; Ainsworth et al., 1978). The SSP is a semi-structured laboratory paradigm involving separations and reunions of the child, mother, and an unfamiliar female stranger. The procedure was videotaped and later reviewed. In addition to classification into one of the three primary categories, infants also were considered for classification as disorganized (Main & Solomon, 1990). In the present study, 9% of infants were classified as avoidant, 33% as secure, and 58% as disorganized.² For the purposes of analyses in this study, the avoidant and secure groups were combined to create a dichotomous variable of organized versus disorganized.

In the current sample, 18 (28%) SSPs were randomly selected for reliability purposes. SSPs were scored independently by two experienced coders (trained by and reliable with E. Carlson & A. Sroufe), who were blind to adult attachment classifications. Concordance between the two coders for the four-way classifications was 89% ($\kappa = .80$, $p < .0001$). Disagreements were resolved by conferencing.

Maternal interactive behavior: The AMBIANCE (Bronfman et al., 1999). The assessment of disrupted behavior followed the procedures of Bronfman et al. (1999) and began with the compilation of a comprehensive narrative description of each interaction. A 7-point (where 1 = high normal; 7 = significantly disrupted behavior) level of disrupted communication

¹ All of the mothers classified as preoccupied were also classified as unresolved.

² Similar to other high-risk samples (e.g., Lyons-Ruth et al., 1999), all infants classified as resistant were also classified as disorganized.

score was assigned based on the frequency and intensity of all disrupted behaviors displayed in the course of the interaction. A binary classification was then assigned; scores of 5 or above were classified as 'disrupted' and scores of less than 5 as 'non-disrupted'.

A single coder scored all play sessions and was blind to the SSP and AAI classifications. This coder was trained by and reliable with the original developers of the AMBIANCE (E. Bronfman & K. Lyons-Ruth). Eighteen cases (22%) were scored for reliability purposes. Concordance between the two coders for the bivariate classification was 83% ($\kappa = .67$, $p < .01$). Disagreements were resolved by conferencing.

The Child Behavior Checklist: (CBCL; Achenbach & Edelbrock, 1983). Mothers completed the CBCL for 2–3-year-olds. The CBCL is a widely used, well-validated and standardized report of a child's social and behavioral problems. The CBCL contains 103 descriptions of a broad range of problematic behaviors rated on a three-point scale ('not true', 'somewhat true', and 'often true'). The CBCL consists of eight syndrome scales and two broad-band scales, internalizing and externalizing behaviors. In the present study, we only examine maternal reports of externalizing problems.

Procedure

Mother–infant dyads were followed from the infant's birth until their second birthday. AAI was administered in the home at infant age 6 months. The SSP was conducted in the University laboratory at infant age 6 months. Immediately after the SSP, mothers were invited to play with their infants for 6 minutes and disrupted behavior was assessed based on this interaction. During a laboratory visit at 24 months, mothers were asked to complete the CBCL for 2–3-year-olds.

Data analytic strategy

Analyses in the present study proceeded in two stages. First, we inspected the bivariate relationships among the constructs. Second, a model was tested using structural equation modeling (SEM) with Mplus (Muthén & Muthén, 2001). Mplus allows the input of both continuous and categorical (dichotomous) variables as independent and dependent variables. The measurement model in which tests are performed include: 1) mediation by disorganized attachment in the link between disrupted behavior and externalizing problems; and 2) mediation by disrupted behavior and disorganization of the link between unresolved representations and externalizing problems. Testing for mediation in SEM is accomplished by comparing change in model fit – the change in chi-square in relation to the change in degrees of freedom – between the model with the mediating effect pathway between disorganized attachment and externalizing behavior freely estimated and the model with the mediating pathway constrained to zero (Holmbeck, 1997). Indirect effects were tested for significance in Mplus. There were no missing values.

Results

Preliminary analyses

A number of preliminary descriptive analyses were performed prior to exploring our main hypotheses. There were no significant attachment group differences for infant gender, maternal age, income, or education. Infant gender, and maternal age and income were not related to disrupted behavior; however, maternal education was related to displays of disrupted behavior.

Descriptive statistics

The relative frequency distributions of the classifications for maternal representation of attachment, maternal behavior, and infant attachment are presented in Table 1. As expected, given the high-risk character of the sample, many mothers displayed unresolved attachment representations (30%) and disrupted behavior (58%), and many infants were in disorganized attachment relationships (58%).

Before testing the mediational model, we inspected the bivariate associations among the predictors and the outcome (see Table 2). All variable pairs were positively related.

Model testing

The main aim of this study was to test whether disorganized attachment mediated the link between disrupted behavior and externalizing problems. Mediation exists when a predictor affects a dependent variable indirectly through an intervening

Table 1 Distribution of disorganized/organized attachment classifications, unresolved/not-unresolved attachment representations, and disrupted and non-disrupted classifications

	Unresolved ($n = 19$)		Not-unresolved ($n = 45$)	
	Disorganized ($n = 15$)	Organized ($n = 4$)	Disorganized ($n = 22$)	Organized ($n = 23$)
Disrupted ($n = 37$)	13	2	17	4
Non-disrupted ($n = 27$)	2	2	6	22

Table 2 Bivariate correlations of the model variables

	1	2	3	4
1. Unresolved attachment representations	–			
2. Disrupted maternal behavior	.28*	–		
3. Disorganized attachment relationships	.30*	.52**	–	
4. Externalizing behavior problems	.34**	.30**	.39**	–

Note. *Correlation is significant at the .05 level; ** correlation is significant at the .01 level.

variable. Conditions for testing mediation are significant relations between independent and dependent variables, between independent variables and mediators, and between mediator and dependent variables (e.g., Baron & Kenny, 1986). The bivariate associations showed that these conditions were met.

The chi-square difference test comparing the mediated model ($\chi^2(1) = 2.25$, $p = .13$) with the direct model (in which the link between disorganized attachment and externalizing problems was constrained to zero) ($\chi^2(2) = 6.41$, $p = .041$) revealed a significant change in model fit between the two models ($\Delta\chi^2(1) = 4.17$, $p < .05$). The mediation model proved to be the most parsimonious. The indirect pathways from the distal predictors unresolved attachment and disrupted maternal behavior were tested within this model (Muthén & Muthén, 2001). The indirect effect of disrupted maternal behavior on externalizing behavior via disorganized attachment relationships appeared significant (.15, $p = .05$), whereas the indirect effect of unresolved attachment representation – disrupted maternal behavior – on externalizing behavior problems via disorganized attachment relationships was not significant. Figure 1 depicts the final mediation model.

Discussion

The overall purpose of this investigation was to gain a better understanding of the role of disorganized attachment in the development of toddler externalizing problems. Disorganized attachment at one year of age was associated with externalizing behavior problems at two years of age. This finding echoes a growing body of empirical research of children from diverse populations and of varying ages (see Van IJzendoorn et al., 1999 for a review). This research was extended by our findings that maternal unresolved attachment representation at 6 months, as well as observed disrupted behavior at 12 months, was also associated with toddler externalizing problems.

To increase our understanding of the dynamic interplay between the aforementioned variables and to explore Bowlby's (1969/1982) conceptualization of the role of the attachment relationship in the

development and manifestation of behavioral maladaptation, we explored the mediational role of disorganized attachment in the development of psychopathology. Results of structural equation modeling suggest that disorganized attachment serves as a mediator between disrupted behavior and maternal reports of toddler externalizing problems. This result is consistent with a model in which the development of psychopathology is a cumulative function of dysregulated dyadic interaction (Carlson, 1998; Sroufe et al., 1999). Although the direct pathway from unresolved attachment to externalizing behavior was no longer significant after including disorganized attachment as a mediator, the indirect pathway from unresolved attachment through disrupted caregiving and disorganized attachment to externalizing behavior was not significant. Each aspect of the findings will be discussed in turn, followed by consideration of research implications and limitations.

Although attachment theory clearly has been central to uncovering the processes associated with the development of adaptive relationships in infancy and beyond, the theory's original formulation was substantially driven by Bowlby's (1969/1982, 1988, 1989) quest for a meaningful model of the development of psychopathology. Bowlby's efforts to explicate the etiology of psychopathology and delinquency led to his formulation that attachment-relevant disruptions in the child's first year of life would impair significantly the child's later psychosocial functioning. Specifically, he proposed that dysfunctional patterns of caregiving would increase the risk that a child would develop along a deviant pathway and that such risk is mediated by the quality of the attachment relationship. Empirical confirmation of Bowlby's early contentions was first established by Carlson (1998), who demonstrated that disorganized attachment mediated the association between early dysfunctional parenting and adolescent psychopathology. The current study expanded on these findings by demonstrating that disorganized attachment serves as a mediator in the association between disrupted behavior, a theoretically and empirically established precursor of disorganized attachment, and later toddler behavior problems.

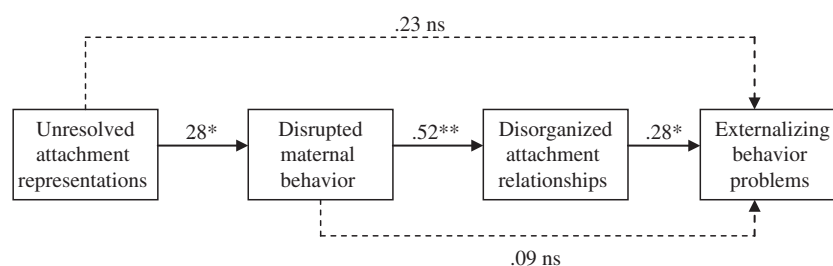


Figure 1 Results for the structural model of disorganized attachment mediating the effects of unresolved attachment representations and disrupted maternal behavior on externalizing behavior problems

These results reinforce the notion that the genesis of behavior problems lies in the dyadic relationship. That is, the way a disrupted caregiver interacts with her disorganized infant affects how the infant relates and interacts with the mother and this dynamic interplay is related to pathological development.

Evidence for a more extended pathway linking externalizing problems to unresolved attachment representations via disrupted maternal behavior and disorganized attachment was equivocal. The direct effect of unresolved attachment on externalizing behavior dropped below significance after including the mediating pathway, suggesting mediation, but the hypothesized indirect pathway was itself not significant. Bowlby's (1969/1982) original hypotheses, as well as more recent formulations, suggest that caregivers' unresolved attachment representation may limit accurate perceptions of their children's current states and thus restrict their ability to respond to their children objectively, consistently and effectively (DeKlyen, 1996; Lyons-Ruth & Block, 1996; Lyons-Ruth et al., 1999; Schuengel, Bakermans-Kranenburg, & Van IJzendoorn, 1999). Caregivers may be too consumed with thoughts and emotions of their own earlier painful vulnerabilities and thus, their child is left without an adequate model for regulating their mental, emotional, or behavioral states (Lyons-Ruth & Block, 1996). This cyclical pattern could conceivably cause more pervasive difficulties within the child, making the child more susceptible to developing disorganized attachment and maladaptive patterns of behavior. Madigan et al. (2006) have demonstrated that disrupted caregiving mediates the effect of unresolved attachment representations on disorganized attachment relationships. The current results leave open the possibility that part of the effects of unresolved attachment may be mediated by other pathways besides disrupted caregiving and disorganized attachment. For instance, other researchers have suggested that aspects of mentalization, including reflective function (e.g. Fonagy, 2002) and mind-mindedness (e.g. Meins, Fernyhough, Fradley, & Tuckey, 2001), may link the global assessments of representations of attachment assessed in the AAI to the quality of caregiver-child interactions and, in turn, to child maladjustment. Future research should therefore elucidate the unique contributions that each of these mental processes among caregivers makes to attachment and psychosocial development.

It is important to underscore that an unresolved representation of attachment, in and of itself, may bias maternal judgments regarding challenging offspring behavior (DeKlyen, 1996). We utilized maternal assessments of offspring behavior problems because the toddler's age made it impossible to collect independent observer reports of early emerging behavioral problems. The toddlers in the current

study were not yet school age, preventing the use of teachers as informants. Furthermore, not all children attended day care and only a subset had regularly involved fathers. Thus, the child's mother was the most suitable, as well as available informant. Diary methodology or experience sampling may provide a useful supplement to questionnaire-based maternal reports of behavior problems in future research (see Christensen, Barrett, Bliss-Moreau, Lebo, & Kaschub, 2003).

It is notable that all three hypothesized precursors of behavior problems in this study were significantly correlated, a necessary requirement for tests of mediation. Although all three precursors were measured using a diversity of methods, none of which included the self-reporting methodology used to assess the toddler's behavior problems, some measures were assessed at concurrent time points. The evaluation of the attachment relationship and mother-infant dyadic interactions were assessed on the same day; thus causality could not be determined. In addition, Bowlby (1969/1982) and others (Cummings et al., 2000) proposed that intervening events and experiences may at any time alter the course of the pathway, directing the child towards relatively more normal or more deviant outcomes. Although addressing these questions goes beyond the focus of this report, recent results presented by the NICHD Early Child Care Research Network (2006) have demonstrated that improvements in parenting quality over time resulted in fewer offspring behavior problems.

To examine higher base-rates of maladaptive patterns of behavior, we utilized a high-risk sample composed of adolescent mother-child dyads. Studies have demonstrated that children of adolescent mothers demonstrate greater socio-emotional problems and are also at an increased risk for developing unfavorable outcomes such as violent offending and early departure from school (Furstenberg et al., 1990; Jaffee et al., 2001). Hence, we caution in generalizing our findings beyond the scope of high-risk mother-infant dyads, and underscore the need for replication in other samples.

A developmental approach to the study of toddler behavior problems means that potential precursors are examined and causal explanations tested. The current longitudinal study underscores the pivotal role of disorganized attachment relationships in infancy in the development of behavioral problems in toddlerhood.

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